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ABSTRACT

The debate over whether the 50 states are meaningful units for macro-sociological research has mostly been conducted on the basis of deductive reasoning. Three sets of analyses that are intended to provide much needed empirical data on this issue were studied. The first set involved all variables in the "County and City Data Book" used to compute correlations across states among variables describing characteristics of the Standard Metropolitan Statistical Areas (SMSAs) of each state with identical variables describing non-metropolitan parts of the states. The second set consisted of three analyses designed to provide information on the extent to which tests of hypotheses produce different results when the units are the entire state, the SMSAs, or the non-SMSAs. The third set included published research on the macro-structural correlates of homicide and rape that revealed parallel results using states, metropolitan areas, and cities. Findings support a "state effect," despite the internal heterogeneity. American states may be appropriate units for macro-sociological research, since their distinctive social characteristics cut across rural/urban and metropolitan/non-metropolitan areas, and their heterogeneity is not a serious impediment. The basis of the widespread skepticism about research that tests sociological theories in terms of comparative state data is discussed. (TJH)

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The Validity of U. S. States As Units for Sociological Research*

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THE VALIDITY OF U. S. STATES AS UNITS FOR SOCIOLOGICAL RESEARCH*

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Abstract

The debate on whether the 50 states are meaningful units for macro-sociological research has mostly been carried out on the basis of deductive reasoning. This paper reports three sets of analyses which are intended to provide much needed empirical data on the issue. (1) All variables in the County And City Data Book were used to compute correlations across states between variables describing characteristics of the Standard Metropolitan Statistical Areas of each state with the identical variables describing the non-metropolitan parts of the states. Of the 90 correlations, 85 were statistically significant, 41% were in the .50-.79 range, and 36% were correlations of .80 or higher. The consistency and size of these correlations indicates that the metropolitan and non-metropolitan areas within each state tend to share socio-cultural characteristics. (2) Three analyses were carried out to provide information on the extent to which tests of hypotheses produce different results when the units are the entire state, the SMSA areas, or the non-SMSA areas; or rural versus urban areas of the states. In each case, the conclusions which one would reach from testing the hypothesis with state level data were close to those which would be reached on the basis of the more homogeneous aggregations. For example, the hypothesis that there is little or no relationship between educational achievement and the median income of the black population was supported, irrespective of whether the hypothesis was tested with rural data, urban data, or data on the state as a whole. (3) Published research on the macro-structural correlates of homicide and rape revealed parallel results using states, metropolitan areas, and cities. For example, both state-level and city-level studies find that poverty and income inequality, divorce, and % black are correlated with homicide. These findings suggests that there is a "state effect" despite the internal heterogeneity, and that American states may be appropriate units for macrosociological research. The final section of the paper is an essay in the sociology of science which tries to identify the basis for the widespread skepticism concerning research which tests sociological theories on the basis of comparative state data.

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THE VALIDITY OF U. S. STATES AS UNITS FOR SOCIOLOGICAL RESEARCH*

Macrosociological research using units within nations have been a part of sociological methods at least since Durkheim's comparative study of suicide in the departments of France and the Catholic and Protestant states of 19th century Germany (Durkheim, 1897 [1951]). However, contemporary American macrosociological research seems to emphasize either very large units, such as entire nations, or relatively small units such as counties and cities. In particular, there is wide skepticism about the appropriateness of using the 50 states as units of investigation, even

though a number of such studies have been done (e.g., Hicks, Friedland, and Johnson, 1978; Loftin and Hill, 1974; Stack, 1980).

Macro level research carried out under the rubric of "social indicators" also tends to emphasize entire nations as the unit of data aggregation and research. These studies concentrate on time series for nations as a whole (see for example, Social Indicators III; 1980; Taeuber, 1981), or cross-national comparative studies of subjective and objective social indicators (Szalai and Andrews, 1980). American researchers devote relatively little attention to compiling and analyzing social indicators for the states of the United States.

I. QUESTIONS CONCERNING STATES AS SOCIAL UNITS

There are a number of reasons for caution in using U.S. states as units for sociological analysis. The present paper focuses on one of the most important of these reasons: the internal heterogeneity of the states. Many sociologists believe that this heterogeneity makes American states unsuitable units for research, except if the research deals with phenomena that are governed by state statutes or administration, such as taxation and capital punishment.

The heterogeneity problem can be illustrated by New York, which combines one of the most densely populated and urban population centers in the world with the sparsely populated Adirondack mountain counties. Similarly, Illinois combines Chicago and "downstate" counties, which some Chicagoans feel are culturally more akin to the rural South than to themselves. Critics of state level analysis raise the question of whether Chicago and downstate Illinois share anything more than having to pay the same sales tax. Such critics hold that for issues such as the number of children per couple, which have not been the subject to legislative regulation, states are arbitrary aggregations, not meaningful social units.

So great is the reluctance to use states as societal units that it may even be extended to issues involving phenomena which are the properties of states as legal and governmental entities, such as the legal rights of women. This is illustrated by the comments of one of the referees of a paper (Baron and Straus, 1984) which described a "Status Of Women Index" for each state and analyzed its correlation with certain other variables:

> "It would have been preferable, I think, to work with more aggregated data. It is hard to believe that the position of women is a situation that applies meaningfully to states. Cities or SMSAs or counties would come closer to the mark in my view. .... I recognize by the way that the paper is quite explicit in saying that analysis at the city or county level is not possible, as many indicators of the status of women exist only for states. Yet some part of this argument is flawed. If we know the legal status of women in states, for example, we also

know their legal status within all cities in that state. So this piece of datum is not missing at the city level."

Users of state level data might respond by pointing out that internal heterogeneity is not unique to states. Cities and SMSAs are also extremely heterogeneous (compare the South Bronx with the upper West Side of New York City). However, the heterogeneity of lower level units is not a valid rejoinder because states are even more heterogeneous since they encompass both the within-city heterogeneity and also the differences between cities and the non-metropolitan parts of the state. Moreover, since distances are greater between different parts of a state than they are between different parts of even a large metropolitan area, social interaction is less frequent among those who share only a common state residence than it is among those who share residence in the same city or SMSA.

The greater heterogeneity and greater physical barriers to interaction characteristic of states as compared to cities or SMSAs, are empirical facts. However, the idea that states are inappropriate units for sociological research is an inference from these facts, not an empirical finding. Perhaps because such a conclusion seems so obvious, the validity of rejecting the use of state level data has not been tested empirically. The referee who argued that "...cities or SMSAs would come closer to the mark..." is expressing a reasoned opinion, not a conclusion based on empirical evidence because, such evidence does not seem to exist. The purpose of this paper is therefore to report the results of a series of analyses designed to provide empirical data on one aspect of the question of the extent to which states are meaningful units for compiling social indicators and for macrosociological research in general.

Importance Of The Issue

Empirical data on the appropriateness of using state-level data for sociological research is extremely important because there is probably more data available on states than on any other ecological unit within American society. Consequently, if it is valid to use state-level data, it is possible to investigate many important issues which could not otherwise be studied at the macrosociological level. Indicative of the possibilities is the fact that the most recent State And Metropolitan Area Data Book (Bureau Of the Census, 1983) presents information on six times more variables for states than for SMSA's (2,018 versus 320 variables). It is important to have evidence which will help the research community decide whether to regard such data as a temptation to engage in questionable research, or as an underutilized resource. An answer to this question should be based on empirical evidence as well as theoretical analysis.

II. HYPOTHESES AND METHOD

The idea that the states are not meaningful units in a sociological sense implies that the different parts of a state do not share social

organizational and cultural characteristics -- except those imposed by the state constitution, statutes, or regulations. Thus, Los Angeles and rural northern California can be seen as different socio-cultural universes, united only by the historical accident which brought them both within the boundaries of California. If that is the case, and if the fertility rate is low in Los Angeles, it might not tell us anything about the fertility rate in rural northern California. On the other hand, to the extent that states are meaningful socio-cultural units, key social characteristics should tend to apply throughout the state. A state which has a low fertility rate among its metropolitan area population (relative to the metropolitan areas of other states) should also have a low fertility rate among its non-metropolitan area population (relative to fertility rates in the non-metropolitan areas of other states).

Similarly, although Massachusetts has the highest rate of automobile theft in the United States (State And Metropolitan Area Data Book, 1983: 486), this could mainly reflect a high rate of car theft in Boston and the other SMSA's. If the car theft rate in the non-SMSA parts of the state were well <u>below</u> the national average, that could be obscured by the numerical dominance of the SMSA population (85% of the total). The opposite effect could occur in states which have a small metropolitan area population. And in states where the population is more evenly split between metropolitan and non-metropolitan areas, the state level statistic might be a meaningless average of a low and a high rate which represents neither the metro nor the non-metro areas.

<u>Hypotheses</u>

<u>Correlation Of SMSA And Non-SMSA Data</u>. Limited but important empirical evidence on the question of the degree to which states are socio-cultural as well as political entities can be obtained by investigating the extent to which the metropolitan areas of each state (operationally, the Standard Metropolitan Statistical Areas, or SMSAs) share socioeconomic characteristics with the less urbanized parts of each state (operationally, the non-SMSA parts of each state). This was done by testing the following null hypothesis (using the .05 level of significance):

> <u>H1</u>. The correlation between the socioeconomic characteristics of the SMSA and non-SMSA parts of each state is not significantly greater than zero. The same hypothesis applies to correlations between the rural and the urban parts of the states.

If the correlation for the number of violent crimes per 100,000 is .08, the null hypothesis would be accepted, and this would be counted as evidence that states are not meaningful social units. On the other hand, if the correlation between the violent crime rate for SMSA and non-SMSA areas is .91, this would be taken as one bit of evidence that, on the average, the states have socio-cultural characteristics which apply in diverse parts of each state. Of course, a single correlation would not be a dependable basis for reaching such a conclusion. Consequently, these

correlations will be computed for a large number of variables, as described below.

Replication Of Substantive Analyses. Another method of empirically investigating the extent to which states are meaningful social units is to replicate tests of substantive hypotheses for the state as a whole, for the SMSA parts of the states, and for the non-SMSA population. For example, one could replicate a test of the hypothesis that the greater the percentage of college graduates, the higher the median income. The null hypothesis which guided this part of the study is:

> H2. Correlations testing substantive hypothesis on the basis of data for the state as whole, the SMSA parts of states, and the non-SMSA parts of states do not differ significantly from each other.

If Hypothesis 2 is supported, it suggests that the results of analyses using states, rather than being statistical artifacts resulting from an arbitrary aggregation within political boundaries, reflects a social reality that is typical of states as social units.

Data

The data come from two sources. The largest block of data was calculated from the computer tape distributed by the Bureau of the Census which contains all variables in the County And City Data Book, 1983 or CCDB (Bureau of the Census, 1984). The CCDB brings together data from many sources, including the census itself, Bureau of Labor Statistics, FBI, National Center For Health Statistics, Federal Deposit Insurance Corporation, etc. It therefore covers a wide range of societal characteristics. The analysis reported in this paper used all variables (except those pertaining to agriculture) which were in the form of summary statistics for each state, such as median income or the percentage of the population age 65 and over -- a total of 90 variables. Variables in raw data form, such as the number of persons age 5 and under, were not used because they are so heavily influenced by the size of the population.

The CCDB data were used for comparison of metropolitan with non-metropolitan areas (as explained below). In addition certain data from the 1980 census General Social and Economic Characteristics volumes for each state (Bureau of the Census, 1980 Census Of Population, Volume 1, Chapter C) were used to compare rural and urban areas.

Method Of Analysis

Data Preparation. The major data preparation work consisted of aggregating the county level data from the County and City Data Book tape to produce two statistics for each state: one representing the SMSA parts of each state, and another representing the non-SMSA parts of each state.

The rural and urban data were available because those variables had been typed in purposes of certain substantive research.

Data Analysis. Hypothesis 1 was tested by computing Pearson correlations between the SMSA and non-SMSA statistics across the 50 states. Hypothesis 2 was tested by replicating three analyses using data for the entire state, data for the SMSAs, and data for the non-SMSA population.

III. CORRELATION OF METROPOLITAN AND NON-METROPOLITAN STATE DATA

(Table 1 about here)

Table 1 summarizes the overall results of the test of Hypothesis 1. Eighty five of the 90 correlations computed revealed a statistically significant relationship (an r of .27 or greater) between socio-cultural characteristics of the SMSA and the non-SMSA parts of the states. Each correlation indicates the degree to which the more urbanized and less urbanized parts of the states tend to share the same ranking relative to other states on some socio-economic measure.

The Cumulative percentage column of Table 1 shows that two thirds of the correlations are .60 or higher, and more than a third are .80 or higher. These findings require rejection of Hypothesis 1, and therefore provide no evidence for the view that state data represents an arbitrary aggregation across populations which should be kept separate.

These statistics, however, might overstate the extent to which states are units with characteristics that cut across the diverse parts of the states. First, the use of the .05 level is arbitrary even from a hypothesis testing point of view, and a correlation of .27 which meets this criterion does not indicate a large degree of association. Second, the 90 correlations are not 90 independent tests of Hypothesis 1 since they all refer to the same universe of states. Third, some of the variables are highly correlated with each other. For example, there are four variables referring to the racial-ethnic composition of the population, and these must sum to 100. Fourth, the variables cannot be assumed to be equally important indicators of the social and cultural characteristics. We will therefore comment on groups of variables which warrant either particular attention or caution.

(Table 2 about here)

Table 2 shows the correlation for each of the variables used to test Hypothesis 1. The variables are given in the order in which they appear in the County And City Data Book, 1983 (CCDB). The centered headings are those used for each page of the CCDB.

It would not be practical or appropriate to discuss the all 90 correlations and all 90 sets of means in Table 2. Consequently, the

Table 1. Correlation Of SMSA With Non-SMSA Areas For 90 Variables In The County-City Data Book (N=50 states).

Size Of Correlation	% Of 90 Correlations	
	%	Cum %
.90 and above	9.7	9.7
.80 to .89	26.2	35.9
.70 to .79	14.6	50.5
.60 to .69	16.5	67.0
.50 to .59	9.7	76.7
.40 to .49	15.5	92.2
.27 to .39	2.9	95.1
.00 to .26 (non significant r's)	4.9	100.0
Negative correlations	0.0	

Table 2. Correlation of SMSA and Non-SMSA Areas For Selected Social Characteristics (N=50 states)

Characteristic	Mean SMSA	Mean Non-SMSA	r
A. AREA AND POPULATION			
% change in population from 1970 to 1980	16.8	19.4	.60
Population per square mile	5323.4	62.9	.59
% white population	84.4	88.2	.82
% black population	11.0	6.6	.84
% American Indian, Eskimo, Alute population	0.7	2.2	.85
% Asian and Pacific island population	2.2	1.7	.99
% Spanish origin population	4.4	3.5	.95
Males per 100 females	94.9	97.2	.83
B. POPULATION AND HOUSEHOLDS			
Median age	29.2	31.1	.49
% pop moving within same county 75-80	26.1	22.1	.51
% pop moving to diff. county, same state 75-80	8.3	11.2	.50
% pop moving to diff. state or abroad 75-80	15.5	12.6	.82
% persons born in state of residence	58.8	67.3	.88
% persons under 5 yrs old	7.4	7.8	.93
% persons 5 to 17 yrs old	20.9	21.6	.69
% persons 65 yrs and older	9.9	12.6	.68
Persons per household	2.8	2.8	.48
C. VITAL STATISTICS AND HEALTH CARE			
Births per 1000	16.6	16.8	.88
Deaths per 1000	7.7	9.5	.70
% births to mothers under 20	14.5	16.5	.90
Marriages per 1000 population	13.5	13.1	.99
Divorces per 1000 population	6.0	4.7	.65
Physicans per 100K population	159.9	76.7	.36
Hospital beds per 100K population	568.3	516.0	.41
D. NURSING HOMES AND SOCIAL WELFARE PROGRAMS			
Average mnthly pmnt soc sec ret dec	344.2	321.1	.81
Average mnthly pmnt sup sec inc june	169.5	153.2	.81
E. SERIOUS CRIMES AND HOUSING			
Crimes known by police per 100K population	5363.3	3334.1	.53
New houses: % with 1 unit	56.8	65.4	.30
New houses: % w 5 or more units	32.3	22.6	.26
Housing units: % change 70-80	36.8	40.4	.70
Yr-Rnd housing: % vacant	6.6	10.8	.46
Yr-Rnd hsng: % 1 unit structures	64.6	73.5	.56
Yr-Rnd hsng: % >=5 unit structures	19.0	8.0	.63
Yr-Rnd hsng: % with air cond	57.3	40.9	.91

Table 2. Continued

Characteristic	Mean SMSA	Mean Non-SMSA	r
F. HOUSING AND JOURNEY TO WORK			
% housing units without complete plumb	1.6	4.0	.40
% housing units w>=1.01 peop-room	3.9	4.9	.72
% occ hous heating with gas-sample	59.3	46.1	.86
% occ hous heating w elect-sample	18.3	18.7	.82
% occ hous heating w fuel oil-smp	17.7	23.1	.90
% workers outside county of residence	17.9	18.1	.65
% workers driving alone to work	65.3	62.6	.27
% workers carpooling to work	20.2	21.7	.68
% workers using pub tran to work	5.5	1.0	.15
G. EDUCATION AND LABOR FORCE			
School enrollment, persons 3+: % private	11.3	5.8	.69
Persons, 25+: % 12+ years education	71.1	63.0	.76
Persons, 25+: % 16+ years education	18.5	12.8	.49
Civilian labor force: % unemployed 1982	8.6	10.5	.74
Civilian labor force: % female	43.4	40.8	.67
Civilian labor force: % unemployed	6.0	7.1	.87
H. CIVILIAN LABOR FORCE AND PERSONAL INCOME			
Civilian labor force: % manufacturing	19.7	20.0	.72
Civilian labor force: % wholesale and retail	21.3	19.3	.49
Civilian labor force: % professional and relat.	20.8	19.6	.49
Civilian labor force: % employed in govern.	17.9	19.2	.46
Civilian labor force: % self-employed	5.8	10.8	.53
Per capita personal income $	10,147.9	8,522.4	.77
Earnings: % manufacturing	23.4	22.5	.66
Earnings: % wholesale and retail	15.4	12.1	.46
Earnings: % services	18.0	13.9	.53
I. MONEY INCOME			
Median family money income	20,534.4	16,658.0	.87
Household income: % 10K or less	26.7	34.0	.80
Household income: % 10K-19,999	29.4	32.0	.65
Household income: % 20K-29,999	22.7	20.0	.63
Household income: % 30K-39,999	11.4	8.1	.77
Household income: % 40K-49,999	4.9	3.0	.88
Household income: % 50K or more	5.0	3.0	.93
Median household income	17,735.9	14,242.2	.86
Per capita money income	7,278.2	6,056.1	.83
Families: % below poverty level	8.3	11.1	.78
Families: % female hshlder below pov. lev.	28.0	32.0	.57
% Persons below poverty level	10.9	14.4	.81
% Children <18yrs. below poverty level	13.7	17.1	.74

interpretation of the data will be illustrated with respect to the variables in Part A of the table, and to the ten correlations of .90 or higher and the six non-significant correlations (r <.27).

Part A Of Table 2

Population Growth. Consistent with recent population movements, the metropolitan areas of the states had a less rapid population growth in the 1970's than the non-metropolitan areas. At the same time, the correlation of .60 in the first row of Table 2 shows that states which had a high growth rate in metropolitan areas relative to the population growth rate for metropolitan areas of other states, tended to also have a relatively high rate of population growth in the non-metropolitan areas of the state relative to the non-SMSA parts of other states. Or putting it another way, on the average, a similar rate of population growth relative to other states tends to characterize both the metropolitan and non-metropolitan parts of the states.

Population Density. Although metropolitan areas have a population density which is roughly 85 times greater than the density of the non-metropolitan areas, states with a large number of people per square mile in their most urbanized areas (relative to other states) also tend to have a large number per square mile in the less urbanized parts of the state, as shown by the correlation of .59 between the population density of the metropolitan and non-metropolitan areas.

Racial Composition And Sex Ratio. The remaining six correlations in part A of Table 2 show very large correlations (.82 to .99) between various aspects of the racial/ethnic composition of the population in the metro and non-metro areas, and a similarly large correlation for the sex-ratio.

Other High Correlations

Fertility. For reasons which are not clear at this point, three of the highest correlations in Table 2 are for variables pertaining to different aspect of fertility: Percent of the population under age 5 (.93), Percent of births to mothers's under 20 (.90), and Marriages per 1,000 population (.99). One possible explanation is that these correlations reflect a "Southern" pattern; and indeed, the percent of births to mothers under 20 is greatest in the South. However, the West rather than the South has the highest percentage of children under five, and by far the highest marriage rate. Moreover, the identical regional pattern applies irrespective of whether the statistics refer to the state as a whole, to the metropolitan areas each state, or to the non-metropolitan areas.

Air Conditioning And Heating. The strong tendency for states which have a large percent of houses with air conditioning in their metro areas to also have a relatively large percentage of air conditioned houses in

Table 2 Continued

Characteristic	Mean SMSA	Mean Non-SMSA	r
J. LOCAL GOVERNMENT FINANCES			
Local govern.: % intergov. rev. from state gov.	71.3	81.0	.64
Local govern.: % property tax$ per capita	227.3	247.3	.87
Local govern.: direct gen. exp. $ per cap.	686.6	684.5	.86
Local govern. dir. gen. expend: % education	44.8	52.1	.83
Local govern. direct gen. expend: % highway	5.6	8.4	.72
Local govern. dir. gen. expend: %public welf.	3.2	2.5	.94
Local govern. dir. gen exp: %health & hosp.	5.9	7.1	.81
Local govern. dir gen. exp.: %police protect.	5.5	3.9	.75
K. MANUFACTURES			
Mfg.: % estabs w 20 or more employees	32.4	28.6	.63
L. RETAIL TRADE AND SELECTED SERVICE INDUSTRIES			
Retail trade: Annual payroll M$	72.6	67.9	.43
Retail sales: $ per capita	3,651.1	3,009.5	.54
Retail sales: % by estabs with payroll	97.5	94.5	.17
Retail sales: % general merchandise	12.1	6.8	.05
Retail sales: % eating and drinking	9.0	7.8	.23
Selected service estabs: % with payroll	41.5	36.4	.58
Sel. serv. receipts: %from est. w payroll	88.9	75.0	.41
M. SELECTED SERVICE INDUSTRIES			
Sel. serv. recpts: %hotel, motel, camps	10.5	14.4	.65
Selected service receipts: % auto repair	13.5	13.7	.31
Selected service receipts: % recreation	8.9	9.1	.48

their non-metro areas (r = .91) is probably a regional climate effect. In any case, the South has the largest percentage of air conditioned houses, and this holds irrespective of whether the comparison is based on data for the entire state, the metropolitan areas, or the non-metropolitan areas.

The same type of relationship holds for the percentage of houses using oil heat (r = .90), which is characteristic of the Northeastern states. It is important to note that a "climate effect" such as the ones underling the high correlations for air conditioning and oil heat, does not negate using these correlations as evidence on the issue of states as social units. It simply explains why these particular characteristics are common to both the metropolitan and non-metropolitan areas of the states, but does not alter the evidence that the diverse parts of each state have these traits in common. Of course, it can be argued that air conditioning and type of heating system are not very central features of a society, so that sharing such characteristics may not be of great social importance. But counter arguments might be found among those in the Northeast who remember the oil crisis and the shared fate which it brought.

High Income Households. Another variable with a high correlation between metropolitan and non-metropolitan parts of the states is the percent of households with incomes of $50,000 or more (.93). This indicates that states with a larger than average percentage of wealthy households in their metropolitan areas are also above average in the percentage of wealthy households in their non-metropolitan areas.

Low Correlation Characteristics

The variables with non-significant correlations between metropolitan and non-metropolitan areas are the percent of new houses with five or more units (.26), the percent of workers driving to work alone (.27), the percent of workers using public transportation to work (.15), the percentage of retail sales by establishments with paid employees (.17), the percentage of retail sales made by general merchandise stores (.05), and the percentage of retail sales made by eating and drinking establishments (.23). Except for the fact that three of the variables refer to retail sales, there does not seem be any element which is common to them, and which might provide a clue to why the "state effect" which is so pronounced for almost all other variables, does not apply to these six variables.

IV. RURAL-URBAN CORRELATIONS

The distinction between metropolitan and non-metropolitan areas does not identify completely different types of social systems. In fact, many of the metropolitan counties contain substantial rural areas, including farms. Similarly, many non-metropolitan counties contain small cities. Consequently, it is desirable to examine the issue of whether states have identifiable characteristics which cut across ecological boundaries by using the census rural-urban dichotomy. This classification has fallen out

Table 3. Correlations Between Rural and Urban Areas For 37 Characterisitcs (N=50 states).

Size Of Correlation	% of 37 Correlations	
	%	Cum %
.90 and above	5.4	5.4
.80 to .89	5.4	10.8
.70 to .79	18.9	29.7
.60 to .69	18.9	48.6
.50 to .59	13.5	62.1
.40 to .49	10.8	72.9
.27 to .39	18.9	91.8
.00 to .26 (non significant r's)	5.4	97.2
Negative correlations	2.7	99.9

of favor for a number of reasons, including the fact that the census defines as urban any place with a population of 2,500 and over. Nevertheless, at least one recent study has shown that this is a meaningful division (Wilkinson, 1984). We therefore investigated the extent to which the rural areas of each state share characteristics with the urban areas of their state by computing the correlation of statistics based on the rural population with the statistics based on the urban population.

(Table 3 about here)

For purposes of exploring the extent of "shared characteristics" across rural and urban areas, we used data which was available from two of our substantive studies: a study of non-marital cohabitation, and a study of the relation between education and income for blacks and whites. A total of 37 variables were available for this analysis, and the results are summarized in Table 3. These correlations show slightly less correspondence between the rural and urban parts of the states than was found between the metropolitan and non-metropolitan areas. However, the fact that the median correlation is approximately .60 (rather than .70 for the metro and non-metro correlations), provides little comfort to those who view states as mere "historical accidents and surveyor's mistakes" and argue that "they hardly matter" as meaningful social units (Garreau, 1981).

V. TESTS OF SUBSTANTIVE RELATIONSHIPS USING METROPOLITAN, NON-METROPOLITAN, AND STATE DATA

The analyses reported in this section address the concern that use of state level data produces errors in estimating parameters. The errors can be in the form of failing to find a relationship which actually exists, perhaps because it is lost in the larger aggregation. The other side of the coin is the concern that erroneous relationships might be produced as an artifact of the aggregation. To investigate this issue, we carried out three different analyses, two based on a theoretical hypothesis, and a third which used a mechanical selection process to determine the correlations to be examined. Each of the three analyses were replicated three times: first with data on the entire state, and then with data in which the heterogeneity problem was reduced by restricting the analysis to less heterogeneous population groupings.

Race Differences In the Relation Between Income And Education

One of the ways that discrimination against blacks might be evident is in a lower rate of "returns to education" than applied to whites. To investigate this idea, we computed the correlation between education and income for blacks and for whites. The purpose was to test the hypothesis that, although there is a significant correlation for whites, for blacks there is little or no relationship between educational

Table 4. Correlation of Education With Income for the White and Black Population, Replicated for States as a Whole, for Urban Areas of the States, and for Rural Areas of the States (N-50).

Median Income For	% High School Grads			% College Grads		
	State ec12h	Urban ec12hu	Rural ec12hw	State ec13h	Urban ec13hu	Rural ec13hw
White	.56***	.42**	.65***	.47**	.36**	.56***
Black	.12	.03	.30*	-.16	-.13	-.06

Note on Variable Names. The designations ec12h, ec12hu, etc in the column headings permit identification of these variables from among the more than 10,000 variables in the State And Regional Indicators Archive of machine readable state data. The variable names for the median income figures with which these six education figures were correlated are: For whites: entire state - c8a72h, urban - c8a72hu, and rural - c8a72hw; and for blacks: entire state - c8a72b, urban - c8a72bu, rural - c8a72bw

* $p < .05$, ** $p < .01$, *** $p < .001$

attainment and median income. This issue is best examined with time series data. However, for purposes of examining the question of whether the heterogeneity of states leads to misleading conclusions when testing hypotheses of this type, these correlations provide at least some evidence.

(Table 4 about here)

Table 4 presents correlations between educational level and median income, separately for blacks and whites. The correlation of .56 in the upper left corner of the table shows that for the states taken as a whole, the higher the percentage of the white population who completed high school, the higher the median income of the white population. The findings are essentially the same for the urban and rural parts of the states (.42, .65). On the other hand, the three coefficients just below, in the row labeled Black, show either no significant correlation between the high school completion rate of blacks and black median income, or a substantially lower correlation.

If educational attainment is measured by the percentage who graduated from college, the results are even more clear. For the white population, the larger the percentage who completed college, the higher the median income; whereas for blacks, there is a non-significant negative relationship. For the purposes of this paper, however, the critical issue is not the substance of the findings and their meaning, but the fact that the results based on the states as a whole, despite their internal heterogeneity, lead to essentially the same conclusion as the results based on statistics for less heterogeneous aggregations.

Factors Associated With Non-Marital Cohabitation

At the time this paper was being written, we were beginning a study of non-marital cohabitation and therefore had available two measures of this phenomenon for urban areas, rural areas, and for the state as a whole. The measures are the percent that cohabiting couples are of all families (including single parent families), and the percent that cohabiting couples are of all husband-wife couple families. The analysis to be reported here tests the hypothesis that non-marital cohabitation is part of a more general state climate of non-traditional roles. To test this hypothesis, we computed the correlation of five indicators of non-traditional roles with the two cohabitation rates, as shown in Table 5.

(Table 5 about here)

Before discussing Table 5 it should be noted that the data are not completely suitable because the five non-traditional role variables are for the state as whole. Thus, except for the correlations listed under "State" the populations used for the variables in the rows do not correspond exactly with the populations used for the columns. For example,

Table 5. Correlation of Non-Marital Cohabitation Rate with selected other Variables, Replicated for States as a Whole, for Urban Areas of the States, and for Rural Areas of the States (N-50).

Other Non-Traditional Role Indicator	Correlation With: Cohabiting Couples as Percent of All Families			Correlation With: Cohabiting Couples as Percent of all Couples		
	State ec16r1	Urban ec16ur1	Rural ec16wr1	State ec16r2	Urban ec16ur2	Rural ec16wr2
% Women in non-tradit. occupations - v1450	.61***	.55***	.57***	.65***	.44***	.50***
Legal Status Of Women Index - z36	.38**	.27*	.31*	.29**	.43**	.56***
Divorce rate per 100k sa263	.34**	.36**	.36**	.27*	.42**	.16
Alternative lifestyle grps per 100K - v1257r1	.60***	.23	.29*	.73***	.44**	.73***
Abortion rate per 1K women - z104r	.56***	.68***	.70***	.74***	.51***	.51***

* p <.05, ** p <.01, *** p <.001

the second coefficient in row 1 shows that the percentage of women in non-traditional occupations for the entire state is correlated .55 with the rate of non-marital cohabitation for the part of the state population which resides in an urban area.

Keeping in mind possible biases due to the difference between the populations used for the row and the column variables, Table 5 shows that each of the non-traditional role indicators is associated with non-marital cohabitation, and that this applies to the correlations for states, for urban areas of states, and for the rural areas of the states. There are only two instances of correlations which are significant for the state as whole, but not for the urban or the rural populations taken separately. Moreover, the magnitude of the correlations is similar. Nevertheless, the fact that there are even two exceptions is important. Although the results reported in this paper suggest that states have distinctive characteristics which cut across rural and urban areas, and which usually produce similar correlations for the rural and urban parts of the states, that is always an empirical issue.

County-City Data Book Correlations

(Table 6 about here)

The last analysis compares correlations based on states as a whole, the Standard Metropolitan Statistical Areas (SMSA's) areas, and the non-metropolitan areas. It uses variables selected from the 90 variables from the County-City Data Book (CCDB) listed in Table 2. The two variables forming the columns of Table 6, population growth from 1970 to 1980 and median income, were selected because they have a correlation of zero with each other, and because they represent conceptually different types of phenomena. The five variables forming the rows of Table 6 were selected by a mechanical process intended to avoid the possibility of choosing variables which might bias the case in a favored direction, and also to restrict the amount of data which would need to be presented. The selection was accomplished by correlating all 90 CCDB variables with these two variables, and then choosing the first five variables which exhibited a statistically significant correlation (at the .01 level) with either "column variable," and a non-significant correlation with the other "column variable." The hypothesis tested is that the correlations for the SMSA and for the non-SMSA population follow the same pattern as for the state as a whole.

The first variable to meet this criterion is shown in Table 6, in the row labeled "Population per square mile." It has a correlation of -.36 with population growth rate, and .03 with median income. Thus population density is related to a low growth rate, but has no relation to income. This pattern applies to correlations based on statistics using the entire population of the state, and also the SMSA's of the states. However, it does not apply to the non-SMSA areas. Thus, the hypothesis is only partly supported by the correlations in the first row of Table 6. On the other hand, with the exception of these two correlations, all the other 28

Table 6. Correlation of Population Growth Rate and Median Income with five other variables, for States as a Whole, for Urban Areas of the States, and for Rural Areas of the States (N-50).

	Pop. Growth Rate			Median Income		
Correlate	State cb4r	Metro cb4sr	Non-M cb4nr	State cb125	Metro cb125s	Non-M cb125n
Population per square mi cb5r, cb5rs, cb5rn	-.36**	-.38**	-.20	.03	-.02	.32*
Percent urban cb6r, cb6rs, cb6rn	.04	.09	.18	.54***	.44***	.34**
Percent Spanish origin cb11r, cb11rs, cb11rn	.37**	.34**	.34**	.07	.09	-.03
% births to mothers <20 cb31r, cb32rs, cb31rn	.07	.00	-.03	-.60***	-.55***	-.67***
Births per 1,000 pop. cb32, cb32s, cb32n	.49***	.48***	.30*	.07	.25*	.14

* p <.05, ** p <.01, *** p <.001

correlations (93%) are consistent with the hypothesis. Thus, findings based on data for the entire state for the most part also apply to the metropolitan areas and to the non-metropolitan areas.

Other Cross-Level Parallel Findings

The robustness of findings using state level data can also be investigated by comparing the results of studies on the same issue whenever some investigators have used state data and others have used city, county, or SMSA data. A systematic analysis of that type is beyond the scope of this already lengthy paper. However, some suggestion that there are likely to be many instances of parallel findings comes from studies of social factors related to homicide which were included in the review of literature sections of a recent paper (Baron and Straus, 1987a), and from a recent comprehensive review of research on the relationship between unemployment and crime.

Homicide. Three variables have been found to be related to homicide using state-level data and also other social units: (1) Inequality and poverty (which are grouped because they are typically correlated .90 or higher) have been found to be related to homicide at the state level (Loftin and Hill, 1974; Baron, 1985) and also at the city or SMSA level (Blau and Blau, 1982; Messner, 1983; Williams, 1984). Williams and Flewelling (1986) report the relation of the percent poor to the rate of homicides which occur between family members, acquaintances and strangers. These three analyses were replicated using cities, metropolitan areas, and states as the units, for a total of nine regressions. The coefficients using tended to be slightly lower for metropolitan areas and states than for cites for intra-family and acquaintance homicides. In the case of stranger homicides, the relationship was not significant for metropolitan areas or states, but was for cities. (2) Baron (1985) found a strong relation between the percentage of divorced persons in the population of a state and homicide, as have Blau and Blau (1982) and Gove (1982) at the city/metro area level. (3) The black percentage of the population has been found to be related to homicide at both the state level (Baron, 1985) and the SMSA level (Blau and Blau, 1982). Williams and Flewelling regressed homicide rates for families, acquaintances and strangers on the percent black using cities, metropolitan areas, and states. All nine of the analyses found a statistically significant relationship. In each set of three the effect sizes were similar, with the exception that coefficient for stranger homicides using states as the units was somewhat lower than the analyses using cities and metropolitan areas.

Unemployment and Crime. Chiricos (1987) located 63 studies which reported the relationship between the unemployment rate and 14 categories of crime, for a total of 288 tests of the hypothesis. Thirty of these used state-level data and property crime as the dependent variable. Ninety percent of the analyses using state data found a positive relation between unemployment and crime, and 10% found a negative relationship. Thirty six analyses used cities or counties, with 89% finding a positive relationship and 11% a negative relationship. In addition, there were 16

analyses using SMSA's, of which 81% found a positive relationship unemployment and property crime and 19% a negative relationship. Thus, the results using states are parallel to those using other types of social units in supporting the theory that unemployment is linked to crime when property crime is the dependent variable. On the other hand, when violent crime is the dependent, support for the unemployment-crime relationship was much less clear regardless of the type of social unit. Of the 28 analysis using states, 64% found a positive relationship with unemployment and 36% found a negative relationship. Of the 33 analyses using city or county data 76% were positive and 24% negative. Of the 27 analyses using SMSA's as the societal unit, 56% found a positive relationship between unemployment and crime and 44% found a negative relationship.

VI. THE CHOICE OF UNITS FOR MACRO-SOCIOLOGICAL RESEARCH: AN ESSAY IN THE SOCIOLOGY OF SCIENCE

The results reported in this paper suggest that the states of the United States have distinctive social characteristics which cut across rural and urban areas, and metropolitan and non-metropolitan areas. Moreover, hypotheses tested with data for the states tend to be replicated when the analysis uses more homogeneous aggregations. These findings suggest that the heterogeneity of states is not the serious impediment which is widely assumed. In addition there is a long history of successful use of state level data, and more data is available for states than for any other socio-political unit of American society. Finally, there are a number of other reasons for focusing on states as units of American society, including the fact that for millions of Americans their state is a source of identity and pride, and the fact that states are a basic unit of governmental and non-governmental social organization (see Straus and Jaffee, 1986 for a detailed discussion of these points). If all of this is correct, what could account for the widespread distrust of research using data on American states? The balance of this paper will be devoted to a theoretical analysis suggesting some possible factors.

Preference for Micro-Level Research

Although a main theoretical focus of sociology is on societal level forces, in practice the number of empirical studies which use societal level data is only a fraction of those which use data on individual persons or families. American sociology tends to have a social-psychological and micro-analytic perspective. Consequently, societal level data -- irrespective of whether it is on nations, cities, or states -- tends to be distrusted. Ironically, part of the distrust comes from the possibility that findings based on macro-level data do not necessarily coincide with those based on individual level data -- as though the latter were the "truth." This is usually expressed as a concern with avoiding the "ecological fallacy." But as Menzel (1950) notes, social system level variables are phenomena in their own right, and are more meaningful for many key sociological issues.

The micro-level preference of American sociology, however, cannot explain the distrust of state level research on the part of sociologists who themselves do macro-level analysis using nations, cities, or SMSA's. Consequently, other factors need to be considered.

Assumptions About American Society

Overestimate of Homogenization Of American Society. There is no doubt that many of the differences between states and regions have been eclipsed by developments ranging from national hamburger and hotel chains, to national television networks and national school achievement tests (see Hofferbert, 1968; Williamson, 1965 for statistical evidence). However, the trend has not gone nearly as far as seems to be assumed, and for some spheres of life -- such as the presence of an Hispanic population -- the differences between states are becoming greater.

An analysis of two samples of variables from the State And Regional Indicators Archive (Straus, 1985) shows that large differences between states are typical in respect to almost every conceivable sphere of life. This analysis was carried out by drawing two random samples of 25 variables each from among the first 2,000 variables in the Archive. For each of the 50 variables, the statistic for the top ranking state was divided by the figure for the bottom ranking state. For example, the 1976 assault rate of 450 per 100,000 population for South Carolina was 9.4 times greater than the rate of 48.0 for New Hampshire. The enrollment in private secondary schools ranged from a low of 1 per 1,000 population in Wyoming to 36 per 1,000 in Massachusetts, i.e 36 times greater in the top state. The median of these ratios shows that the values for the top ranking states were 4.2 times greater than those for the bottom ranking states for the first sample of 25 variables, and 5.2 times greater for the second sample of 25 variables.

Presumed Dominance of the Federal Government. The drift of power from state to federal government is clearly a long term major change in American society, and is probably one of the factors which lead sociologists to misperceive the importance of states. But this presumed decrease in the power of the states is itself a partial misperception. The growth of federal power has by no means rendered states impotent. States continue to exercise enormous power. They directly or indirectly control a vast array of activities, such as education at all levels, taxes, criminal legislation and prosecution, workmen's compensation, the licensing of barbers, psychologists, and physicians; and the regulation of banks and public utilities. The very existence of cities and other units of local government depends on acts or charters of the state legislature.

Moreover, counterbalancing the loss of certain powers to the federal government is a dramatic, and perhaps even greater gain in power relative to local government. This is partly due to changes in technology, and partly due to the fiscal plight of the cities. Their financial difficulties have led to an increase in financial dependence on the states

and a corresponding increase in the power of the states -- a process that is most dramatic in the case of New York City, but is occurring nationwide (New York Times 27 September 1978: 1).

Concentration of Population in Metropolitan Areas. The fact that two thirds of the U.S. population now lives in one of the SMSA's may have contributed to the assumption that states are no longer socially meaningful units which differ in ways that permit tests of sociological theories. However, to our knowledge, no one has produced empirical evidence which demonstrates that there are greater differences between cities or SMSA's than between states, or that cities or SMSA's are more superior units for macro-sociological analysis. Consequently, as in the case of the "homogenization" and "loss of power" explanations the concentration of population in metropolitan areas cannot by itself explain the misperception of the utility of states as units for macro level research.

Confounding with SES, Race, etc. Accounts for State Differences. It is widely assumed that what differences there are between states or regions reflect confounding with variables such as socioecomic level and racial composition. However, those who make this claim fail to provide empirical evidence. Our own research suggests that regression coefficients estimated using state level data remain after the introduction of numerous controls (Baron and Straus, 1984; 1985).

The Social-Psychology Of the Research Community

If there are in fact large and important differences between states; if these differences characterize both the metropolitan and non-metropolitan areas of the states; if the states remain important in respect to fiscal, regulatory, and a host of other functions; and if parameters estimated using state data are not spurious, why do sociologists tend to assume the opposite? Two factors which, either jointly or separately, might bring this about will be mentioned.

Local versus Cosmopolitan Orientation. One possible explanation for the assumed misperception of this aspect of American society is traceable to the fact that the careers of academics (especially those who do research) are nationally oriented. A typical career bridges several states. More important, except at the time state legislatures review the budget for higher education (and not even then for private universities) the focus of attention is national, or sometimes regional, but almost never state-level. Many sociologists who have taught at a state university for 20 or more years do not think of themselves as "Georgians" or "Oregonians." In their world, the states are unimportant, and they may tend to attribute their own world view to the rest of society.

Liberal Political Orientation. Another even more speculative factor which might account for the misperception of the role of states in American society is the liberal political orientation typical of social

scientists. Political liberals have been engaged in a long struggle with the states. For many, the image of the states is one of chaotic and corrupt state legislatures; of impotence in the face of the Great Depression (from which the states -- to say nothing of individual citizens -- were rescued by the federal government); and for another generation, states evoke the image of a governor standing at the high school door blocking the entrance of black students. "State's rights" is almost synonymous with everything that liberals loath. Just as the Regan administration takes the view that everything the federal government does is suspect, many liberal social scientists tend to the view that the states can do no right. This perception of the states is reflected in the report of the National Commission On Intergovernmental Relations:

> [States]... were last put under extensive scrutiny in the 1950's and early 1960's when they were exposed as arcane and parochial institutions dominated by rural interests, hampered by unworkable constitutions and procedures, unduly influenced by special interests, insensitive to minorities and the poor, and frequently corrupt. [From then]... until late 1970's, national attention focused on the federal government, while states were widely considered irrelevant... (New York Times 27 September 1981: 1).

It is at least a plausible hypothesis to suggest that the perception of state government as disreputable and irrelevant has spilled over to the perception of states as irrelevant as social systems. If that is the case, it may be one of the factors which accounts for the distrust of states as units of sociological analysis. Whatever the reason, the empirical data reported in this paper suggest that the distrust is not warranted by the evidence. Rather, research using American states as societal units should be approached with the same caution and skepticism -- not less, not more -- that is needed in designing any research.

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